



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,564	10/31/2003	Tapesh Yadav	037768-0173	1121

24959 7590 11/18/2008
PPG INDUSTRIES INC
INTELLECTUAL PROPERTY DEPT
ONE PPG PLACE
PITTSBURGH, PA 15272

EXAMINER

LIGHTFOOT, ELENA TSOY

ART UNIT	PAPER NUMBER
----------	--------------

1792

MAIL DATE	DELIVERY MODE
-----------	---------------

11/18/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/698,564	Applicant(s) YADAV, TAPESH	
	Examiner Elena Tsoy Lightfoot	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-23 and 25-32 is/are pending in the application.
- 4a) Of the above claim(s) 2,5,7-10,21-23,25,26 and 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6,11-20,27,31 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 9, 2008 has been entered.

Response to Amendment

Amendment filed on October 9, 2008 has been entered. Claims 3 and 24 have been cancelled. Claims 1, 2, 4-23 and 25-32 are pending in the application. Claims 2, 5, 7-10, 21-23, 25, 26, 28-29, and 30 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation greater than 600 °C is not supported by the Applicants' specification as originally filed because the **"600°C" is not even mentioned in the Applicants' disclosure.**

Art Unit: 1792

3. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for 1500-4000⁰C, does not reasonably provide enablement for unlimited temperature of greater than 600⁰C, e.g. 1,000,000 ⁰C or more. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

4. Claims 1, 4, 6, 11-20, 27, 31 and 32 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The high temperature processing conducted at temperatures greater than 1500.degree. C., preferably 2500.degree. C., more preferably greater than 3000.degree. C., and most preferably greater than 4000.degree. C critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The Applicants' specification discloses that metal precursors including claimed metal carboxylate are processed at high temperatures of **greater than 1500 ⁰C** to form the product nano-dispersed powder provided by e.g. plasma, combustion, pyrolysis, electrical arcing in an appropriate reactor (See P88-89).

5. Claims 1, 4, 6, 11-15, 17-20, 27, 31 and 32 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. **Adding carrier particles** to a metal-containing precursor is critical or essential to obtain nanopowders comprising carrier particles with attached particles, the attached particles being formed from the metal-containing precursor, is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

6. Claims 1, 4, 6, 11-15, 17-20, 27, 31 and 32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the

Art Unit: 1792

art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Obtaining nanopowders comprising carrier particles with attached particles, the attached particles being formed from metal-containing precursor, without the step of adding the carrier particles to the metal-containing precursor was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

7. Claims 1, 4, 6, 11-15, 17-20, 27, 31 and 32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for obtaining nanopowders comprising carrier particles with attached particles, the attached particles being formed from metal-containing precursor, with the step of adding the carrier particles to the metal-containing precursor, does not reasonably provide enablement for obtaining nanopowders comprising carrier particles with attached particles, the attached particles being formed from metal-containing precursor, without the step of adding the carrier particles to the metal-containing precursor. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Rejection of claim 16 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention has been withdrawn due to amendment.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Rejection of claims 1, 4, 6, 11-15, 17-20, 24, and 31-32 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bickmore et al (US 5984997) has been withdrawn due to amendment.

13. Rejection of claims 1, 4, 6, 11-15, 17-20, 24, and 32 under 35 U.S.C. 103(a) as being unpatentable over Konig et al (US 5,356,120) in view of Holzl (US 3,565,676) has been withdrawn due to amendment.

Examiner Note

The current Application is DIV of 10/004,387 and CIP of 5 parent applications. The current Application contains a limitation “greater than 2500⁰C” in Claim 1 and “greater than 3000⁰C” in Claim 15. This limitation was added *first* time to the Divisional Application 10/004,387 (now Patent 6,652,967). Therefore, the current Application is entitled to priority data of the Divisional Application ‘387, which is 8/8/2001 (not to filing date of earliest parent application 08/707,341).

14. Claims 1, 4, 6, 11-20, 27 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeya et al (US 5,489,449) in view of Bickmore et al (US 5984997).

Umeya et al discloses a method of manufacturing powder by introducing particles of a core material in a monodisperse state into a stream carrying the ultrafines of a coating material formed in a vapor phase by a Chemical Vapor Deposition (CVD) or a Physical Vapor Deposition (PVD) such as a Radio Frequency Plasma process (RF) and a laser process, and contacting said ultrafines of the coating material with particles of the core material in a fluidized state to strongly deposit the ultrafines onto the surface of said core material (See column 2, lines 23-25). The *core* and the *coating* materials are composed of the inorganic non-metallic or metallic materials which include all inorganic materials known as refractory or ceramics, e.g. metal oxides and nitrides and intermetallic compounds and alloys such as Fe-Ni-Si alloy, Fe-Cr-Al alloy, Fe-Cr-Mo alloy, Fe-Ni-Cr alloy, Ni-Cr alloy and others; and composite materials thereof (See column , lines 36-62). The coating materials may be the same as or different from the core materials as mentioned above, depending on the desired properties and functions of the coated particles (See column 2, lines 62-64). Umeya et al teaches that the ultrafines of the inorganic non-metallic or metallic materials used as the coating material can be prepared by known procedures, including physical means such as arc-discharge plasma jet, arc dissolution, high-frequency plasma, gas evaporation or chemical means such as reduction or oxidation of vapor of inorganic non-metallic or metallic materials or thermal decomposition of hydrocarbon or its derivatives (See column 3, lines 1-10). The particles of the core material are introduced into a *vapor* stream containing the ultrafines of the coating material by any means, e.g., in the form of a dispersant in a vapor phase carried by a carrier gas and the ultrafines are contacted with the particles of the core material in a fluidized state (See column 3, lines 12-17). In that case, the ultrafines as prepared by the physical or chemical means are in a nascent state, i.e., in an activated state containing a free radical. When the ultrafines come into contact with the particles of the core material, the ultrafines will be

Art Unit: 1792

covalently bonded to the particles, by which both particles are chemically bonded together strongly. See column 3, lines 17-23. For example, diamond core particles are coated with titanium ultrafines by introducing argon and hydrogen into the plasma torch to form a plasma flame, then introducing titanium chloride into the plasma flame while being carried by an argon gas carrier by which there were produced titanium ultrafines (See column 6, lines 16-22). Subsequently, diamond particles were introduced while being carried by an argon carrier gas supplied and the diamond particles were brought into contact with the titanium ultrafines in a fluidized state (See column 6, lines 23-27). The diamond particles were coated uniformly with titanium ultrafines (0.01-0.05 μ predominantly 0.02 μ) (See column 6, lines 29-32).

Umeya et al fails to teach that ultrafines of the inorganic non-metallic or metallic materials are prepared by processing metal carboxylates in the presence of air; and the combustion product gases are cooled and *quenched* to freeze the growth and further reaction of the product (Claim 1).

Bickmore et al teaches that ultrafine particles may be produced by feeding metal-containing precursors of multiple metals (See column 3, lines 52-67) such as nitrate, nitrites, nitriles, nitrides, carbonates, bicarbonates, hydroxides, cyanos, organometallics, *carboxylates* (See column 4, line 32), amines, and amides (See column 4, lines 30-33) in the form of solutions or suspensions or emulsions (See column 4, lines 33-35) in *atomized* state (i.e. claimed spraying) or, alternatively, carried in a gas or a mix of gases (See column 5, lines 19-20) to a reaction zone thereby creating a *vapor* of the precursor; adding nitrogen, hydrogen (See column 2, lines 33-34), air, oxygen or ammonia (claimed reactive fluid) to the reaction zone (See column 5, lines 23-25); conducting *combustion* (See column 5, lines 19-46) using any kind of flame including *externally heated* flame, *multiple burner flame* or a combination of different flames (See column

Art Unit: 1792

5, lines 44-46) at temperatures in excess of 600⁰C at which diffusion kinetics will be sufficiently fast that a compositionally uniform powder will be produced (See column 5, lines 46-50). The combustion product gases are *quenched* (See column 5, line 60) to freeze the growth and further reaction of the product by expansion of gases, addition of coolant gases or liquids, addition of materials which absorb heat (for example, heat absorption associated with phase transformation of liquid nitrogen to gaseous nitrogen), radiative cooling, conductive cooling, convective cooling, application of cooled surface, or impinging into liquid (See column 5, lines 64-67 to column 6, lines 1-4). It is the Examiner's position that temperatures in excess of 600⁰C include claimed temperature of "greater than 3000⁰C" since Bickmore et al do not limit combustion temperatures.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a method of Bickmore et al by introducing metal carboxylate in a gas carrier containing air into a reaction zone to provide the desired ultrafines in Umeya et al from metal carboxylate vapor since Umeya et al does not limit its teaching to any particular procedure.

As to claimed ratio of at least 2, Umeya et al teaches that the ultrafines of the coating materials have an average particle size in the range of 0.005 μ to 0.5 μ (5 nm-500 nm) (See column 2, lines 66-67); and the core particles may have an average particle size of e.g. 0.1 μ (100 nm) - several μ (See column 4, lines 62-64). Note that an average particle size of each of the core and coating particles *overlap* claimed range of "nanopowders" and "nano-dispersed nanopowders" of less than 250 nm (See Applicants' Published Application, P39 and 45). It is well settled that overlapping ranges are *prima facie* evidence of obviousness. Therefore, it would have been obvious to one having ordinary skill in the art to have selected the portion of Umeya et al's range that corresponds to the claimed range. *In re Malagari*, 184 USPQ 549 (CCPA 1974).

As to claim 6, Bickmore et al teaches that the reactive fluid comprises *oxygen* (See column 9, lines 23-26).

As to claim 12, **externally heated** flame and/or **multiple burner flame** of Bickmore et al teaches that read on claimed concentric zone. In any case, the limitations of dependent claim 12 are described in the specification as being not subject matter of claimed invention (See specification, page 27, P64, five last lines).

As to claim 19, Bickmore et al teaches that the method includes instrumentation for quality control (See examples).

15. Claims 1, 4, 6, 11-20, 27 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bickmore et al in view of Umeya et al.

Bickmore et al discloses a method of manufacturing powder comprising: preparing solutions or suspensions or emulsions (See column 4, lines 33-35) of metal-containing precursors of multiple metals (See column 3, lines 52-67) such as nitrate, nitrites, nitriles, nitrides, carbonates, bicarbonates, hydroxides, cyanos, organometallics, *carboxylates* (See column 4, line 32), amines, and amides (See column 4, lines 30-33); feeding *atomized* metal-containing precursor (i.e. claimed spraying) or, alternatively, carried in a gas or a mix of gases (See column 5, lines 19-20) to a **reaction zone** thereby creating a vapor of the precursor; adding nitrogen, hydrogen (See column 2, lines 33-34), air, oxygen or ammonia (claimed reactive fluid) to the reaction zone (See column 5, lines 23-25); conducting *combustion* (See column 5, lines 19-46) using any kind of flame including *externally heated* flame, *multiple burner flame* or a combination of different flames (See column 5, lines 44-46) at temperatures in **excess of 600°C** at which diffusion kinetics will be sufficiently fast that a compositionally uniform powder will be produced (See column 5, lines 46-50). The combustion product gases are *quenched* (See column

5, line 60) to freeze the growth and further reaction of the product by expansion of gases, addition of coolant gases or liquids, addition of materials which absorb heat (for example, heat absorption associated with phase transformation of liquid nitrogen to gaseous nitrogen), radiative cooling, conductive cooling, convective cooling, application of cooled surface, or impinging into liquid (See column 5, lines 64-67 to column 6, lines 1-4); and then nanoscale powders (See column 2, lines 45-49; column 4, lines 14-22) are collected (See column 5, lines 60-63) by separating the fine powder-containing stream into gas and solid stream using bag houses containing polymeric or inorganic filters, electrostatic filtration, surface deposition on cold surfaces followed by scraping with a blade, centrifugal separation, in-situ deposition in porous media, and absorption or adsorption in liquids or solids (See column 6, lines 13-23).

It is the Examiner's position that temperatures in **excess of 600⁰C** include claimed temperature of "greater than 3000⁰C" since Bickmore et al do not limit combustion temperatures.

Bickmore et al further teaches that metal-containing precursors of multiple metals can be used for making mixed metal compounds (See column 3, lines 52-67). Bickmore et al also teaches that with varying combustion conditions, the product chemistry may be varied to obtain e.g. non-stoichiometric *reduced* oxide with the use of reducing gases such as **hydrogen** (See column 2, lines 29-33). Obviously, **metal alloy** powder may be produced in the presence of hydrogen.

Bickmore et al fails to teach that carrier particles are added to a stage of combustion processing (Claim 16); the powder manufactured comprises carrier particles comprising ceramic and attached particles comprising an alloy (Claim 27).

Umeya et al teaches that ultrafines of a metallic material such as a **metal alloy** (See column 2, lines 53-54, 59-65) formed in a vapor phase can be used for producing coated non-

Art Unit: 1792

metallic particles such as **ceramic** particles (See column 2, line 3) which are coated on the surface with ultrafines of the metallic material by introducing the particles of the inorganic material to be coated into a stream carrying the **ceramic** particles and bringing the particles to be coated into contact with said ultrafines in a fluidized state. The coated particles are used for the production of a sintered product. See column 2, lines 23-35. The ultrafines of the metallic materials used as the coating material can be prepared by known procedures, for example, by arc-discharge plasma jet, arc dissolution, high-frequency plasma, gas evaporation or chemical means such as reduction or oxidation of vapor of inorganic non-metallic or metallic materials (See column 3, lines 1-10). The particles of the core material are introduced into a vapor stream containing the ultrafines of the coating material by any means, e.g., in the form of a dispersant in a vapor phase carried by a carrier gas and the ultrafines are contacted with the particles of the core material in a fluidized state (See column 3, lines 12-17). In that case, the ultrafines as prepared by the physical or chemical means are in a nascent state, i.e., in an activated state containing a free radical. When the ultrafines come into contact with the particles of the core material, the ultrafines will be covalently bonded to the particles, by which both particles are chemically bonded together strongly. See column 3, lines 17-23.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a process of Bickmore et al for producing ceramic particles coated with a metallic material such as metal alloy by adding to a ceramic powder formed in the reaction zone of the flow reactor core ceramic particles

As to claim 6, Bickmore et al teaches that the reactive fluid comprises *oxygen* (See column 9, lines 23-26).

As to claim 12, **externally heated** flame and/or **multiple burner flame** of Bickmore et al teaches that read on claimed concentric zone. In any case, the limitations of dependent claim 12 are described in the specification as being not subject matter of claimed invention (See specification, page 27, P64, five last lines).

As to claim 19, Bickmore et al teaches that the method includes instrumentation for quality control (See examples).

16. Claims 1, 4, 6, 11-20, 27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konig et al in view of Holzl, further in view of Umeya et al.

Konig et al discloses a method of manufacturing nanoscale powder comprising providing a metal-containing precursor such as BCl_3 , boric acid esters, boron SiCl_4 , other chlorosilanes, silanes, metal halides, partly hydrogenated metal halides, metal hydrides, metal alcoholates, metal alkyls, metal amides, metal azides, metal boranates and metal carbonyls (See column 2, lines 55-61); evaporating the metal-containing precursor, which may be in solid or liquid state (See column 4, lines 66-68) and feeding *evaporated* metal-containing precursor (See column 5, lines 1-2) and a pre-heated *reactive fluid* such as H_2 , NH_3 or CH_4 or air and/or oxygen (See column 5, lines 7-8) to a reaction zone; conducting processing of the stream at temperatures 500-2000 $^{\circ}\text{C}$ (claimed combustion processing) (See column 5, lines 19-20) thereby producing a metal or ceramic powder; separating the metal or ceramic powder in a back-blowing filter at temperatures 300-1000 $^{\circ}\text{C}$ (claimed cooling) (See column 6, lines 1-5); cooling the powder in a cooling container 12 by blowing in various gas/vapour mixtures (claimed quenching) (See column 6, lines 26-31); and collecting the powder (See column 6, lines 28-29).

Konig et al fails to teach that the combustion processing was conducted at temperatures “greater than 2500 $^{\circ}\text{C}$ (Claim 1) or 3000 $^{\circ}\text{C}$ (Claim 15).

Holzl teaches that WF_4 , WF_3 and WF_2 formed in the reaction zone as by-products during chemical vapor decomposition of WF_6 are non-volatile at the deposition temperatures and become trapped in as a solid impurity in the deposited tungsten. These by-products can be vaporized only at temperatures around 1800-2500⁰C. See column 2, lines 5-15. In other words, the temperature of thermal processing of the metal precursor in a reaction zone would depend on a particular metal precursor. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have conducted thermal processing of the metal precursor in a reaction zone in Konig et al at very high temperatures including claimed temperatures of greater than 2500⁰C or 3000⁰C depending on vaporization temperature of a metal precursor or by-products with the expectation of providing the desired non-contaminated mono-dispersed powder.

As to claim 4, Konig et al teach that nano- or micro-dispersed (crystalline or amorphous) metal and/or ceramic powders, preferably **metal** and/or ceramic powder, carbides, nitrides, borides, silicides, phosphites, sulphides, oxides and/or combinations thereof containing the elements B, Al, Si, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, La, Y, Fe, Co, Ni or these elements alone or in *combination with one another* (i.e. alloy) can be produced using their method (See column 4, lines 21-28).

As to claim 12, Konig et al do not limit their teaching to any of known energy sources such as plasma, laser beam or *flame* (See column 1, lines 26-27). Therefore, any known flame energy sources can be used in Konig et al including well known concentric burners. In any case, the limitations of dependent claim 12 are described in the specification as being not subject matter of claimed invention (See specification, page 27, P64, five last lines).

As to claim 19, Konig et al teach instrumentation for quality control (See column 9, lines 3-20).

Konig et al further teaches that the process may be used for making metal alloy powder (See column 4, lines 21-28). Konig et al in view of Holzl fails to teach that carrier particles are added to a stage of the combustion processing (Claim 16); the powder manufactured comprises carrier particles comprising ceramic and attached particles comprising an alloy (Claim 27).

Umeya et al are applied here for the same reasons as above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a process of Konig et al in view of Holzl for producing ceramic particles coated with a metallic material such as metal alloy by adding to a ceramic powder formed in the reaction zone of the flow reactor core ceramic particles.

17. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Konig et al in view of Holzl, further in view of Umeya et al, as applied above, and further in view of Bickmore et al.

Konig et al further discloses that metal-containing precursors include BCl_3 , boric acid esters, boron SiCl_4 , other chlorosilanes, silanes, metal halides, partly hydrogenated metal halides, metal hydrides, metal alcoholates, metal alkyls, metal amides, metal azides, metal boranates and

metal carbonyls (See column 2, lines 55-61). Konig et al fails to teach that metal-containing precursors include a metal carboxylate.

Bickmore et al teach that metal-containing precursors such as nitrate, nitrites, nitriles, nitrides, carbonates, bicarbonates, hydroxides, cyanos, organometallics, carboxylates, amines, and amides may be used for manufacturing nanoscale powder (See column 4, lines 30-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used metal carboxylates in Konig et al in view of Holzl instead of metal amides with the expectation of providing the desired nanoscale powders since Bickmore et al teach that carboxylates and amides may be used for manufacturing nanoscale powder.

Response to Arguments

18. Applicant's arguments with respect to 103 rejection of claims 1, 4, 6, 11-15, 17-20, 27, 31 and 32 have been considered but are moot in view of the new ground(s) of rejection.

35 U.S.C. § 112, first paragraph-Enablement

1. Enablement of Scope (postulated inoperable embodiments)

(A) Claim 15 is rejected as failing to comply with the enablement of scope requirement. Office action, para. 3. In short, the Examiner believes that postulated inoperable embodiments would exist if one of ordinary skill in the art were to process the stream at any temperature above 600°C, e.g., 1,000,000°C. Applicant respectfully submitted that the Examiner improperly equates postulated inoperability with non-enablement and failed to focus on the actual issue, namely, whether one of ordinary skill in the art would be able to practice the claimed invention without undue experimentation.

The Examiner respectfully disagrees with this argument. The Applicants' specification, while being enabling for 1500-4000°C, does not reasonably provide enablement for unlimited temperature of greater than 600°C, e.g. 1,000,000 °C or more. Therefore, the proper issue is "scope requirement" not "undue experimentation", as asserted by Applicants.

(B) Applicant submits a reasonable amount of guidance about processing temperature exists in the present specification at paragraph 62: [0062] The high temperature processing is

Art Unit: 1792

conducted at step 106 (Figure 3) at temperatures greater than 1500°C, preferably 2500°C, more preferably greater than 3000°C, and most preferably greater than 4000°C. Of course, these temperatures exceed 600°C. In this Amendment, claim 15 has been amended to depend from claim 14, which recites the reacted metal-containing precursor is product of combustion. Claim 15 has been further amended to provide an antecedent (underlined) reading combustion processing is performed at a temperature greater than 600°C. Between the specification, the claims, and the knowledge of one of ordinary skill in the art, one of ordinary skill in the art would be able to practice the claimed invention at a temperature greater than 600°C without undue experimentation. Thus, the present rejection should be withdrawn.

The Examiner respectfully disagrees with this argument. The **“600°C” is not even mentioned in the Applicants’ disclosure**. Therefore, there is no a reasonable amount of guidance that: (i) High temperature processing such as combustion includes processing at temperatures as low as **601°C**; (ii) combustion processing at **601°C** would achieve the same product as high temperature processing conducted at temperatures of greater than 1500°C.

2. General Enablement (critical element missing)

Applicant submitted that the specification does not state the criticality of a particular temperature range, and pointed to paragraph 58: [0058] While the above examples specifically teach methods of preparing dispersed powders of oxides, carbides, nitrides, borides, and carbonitrides, the teachings may be readily extended in an analogous manner to other compositions such as chalcogenides. While it is preferred to use high temperature processing, a moderate temperature processing or a low/cryogenic temperature processing may also be employed to produce high purity nano-dispersed powders.

The Examiner respectfully disagrees with this argument. First of all, the temperature **“600°C” is not even mentioned in the Applicants’ disclosure**.

Second, Applicants’ specification discloses *combustion* processing of claim 14 as being one of “*high temperature*” processing (See Published Application, P89). Therefore, in contrast to Applicants argument, limitation of claim 15 “combustion processing is performed at a temperature greater than 600°C” can relate to “high temperature” processing only (i.e. not to a moderate temperature processing, as asserted by Applicants). Thus, it should be assumed from the Applicants disclosure that the “**moderate** temperature” processing and a “**low**/cryogenic temperature” processing were mentioned by Applicant’s disclosure as known techniques which do not relate to “*high temperature*” processing such as combustion of claims 14 and 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy Lightfoot whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy Lightfoot, Ph.D.
Primary Examiner
Art Unit 1792

November 19, 2008

/Elena Tsoy Lightfoot/